

CLAIMS

What is claimed is:

1. A display apparatus, comprising:
 - a base part;
 - a main body;
 - a slider connected to the main body;
 - a guide rail to stand on the base part, and to guide the slider to slide thereon so as to move the main body up and down; and
 - at least one spiral spring having an elasticity enough to support weight of the main body to extend and contract in response to a movement of the slider.
2. The display apparatus according to claim 1, wherein the guide rail is provided in a pair parallel to each other to stand on the base part at a predetermined distance from each other, and the slider is provided in a pair to correspond to the guide rail to be engaged with the guide rail.
3. The display apparatus according to claim 2, further comprising:
 - a guide bracket coupled to the guide rails;
 - a spring supporting block provided between the sliders, wherein the spiral spring has a first end coupled to the guide bracket and a second end coupled to the spring supporting block.
4. The display apparatus according to claim 3, wherein the at least one spiral spring comprises:
 - a wound part having a spiral shape and coupled to the guide bracket; and
 - a coupling part extended from the wound part and coupled to the spring supporting block.
5. The display apparatus according to claim 4, wherein the at least one spiral spring comprises:
 - a first spiral spring installed in front of the guide bracket; and
 - a second spiral spring installed in the back of the guide bracket.
6. The display apparatus according to claim 5, further comprising:

a first accommodating part to accommodate the first spiral spring and provided on an inner front face of the guide bracket;

a second accommodating part to accommodate the second spiral spring and provided on an inner rear face of the guide bracket; and

third and fourth accommodating parts, each to accommodate the pair of guide rails and provided on both sides of the guide bracket.

7. The display apparatus according to claim 6, further comprising:

a supporting unit provided in the first and second accommodating parts to control extension and contraction of the first and second spiral springs, the supporting unit including:

first and second rotational shafts installed transversely on the first and second accommodating parts; and

first and second spring guides rotatably installed on the first and second rotational shafts on which the wound parts of the first and second spiral springs are respectively wound.

8. The display apparatus according to claim 1, further comprising:

a ball bearing unit provided between the guide rail and the slider.

9. The display apparatus according to claim 8, wherein the ball bearing unit comprises:

a supporting pin disposed between the guide rail and the slider and positioned along a lengthwise direction of the guide rail; and

a rolling ball rollably installed on the supporting pin between the guide rail and the slider and contacted with the slider by a rolling motion.

10. The display apparatus according to claim 9, further comprising:

a supporting bracket provided between the main body and the guide bracket and having a supporting part to support the main body, and an extended part extended downward from the supporting part and coupled to the pair of sliders by passing through the guide bracket.

11. The display apparatus according to claim 2, further comprising:

a ball bearing unit provided between the guide rail and the slider.

12. The display apparatus according to claim 11, wherein the ball bearing unit comprises:

a supporting pin disposed between the guide rail and the slider and positioned along a lengthwise direction of the guide rail; and

a rolling ball rollably installed on the supporting pin between the guide rail and the slider and contacted with the slider by a rolling motion.

13. The display apparatus according to claim 12, further comprising:

a supporting bracket provided between the main body and the guide bracket and having a supporting part to support the main body, and an extended part extended downward from the supporting part and coupled to the pair of sliders by passing through the guide bracket.

14. The display apparatus according to claim 3, further comprising:

a ball bearing unit between the guide rail and the slider.

15. The display apparatus according to claim 14, wherein the ball bearing unit comprises:

a supporting pin disposed between the guide rail and the slider and positioned along a lengthwise direction of the guide rail; and

a rolling ball rollably installed on the supporting pin between the guide rail and the slider and contacted with the slider by a rolling motion.

16. The display apparatus according to claim 15, further comprising:

a supporting bracket provided between the main body and the guide bracket and having a supporting part to support the main body, and an extended part extended downward from the supporting part and coupled to the pair of sliders by passing through the guide bracket.

17. The display apparatus according to claim 4, further comprising:

a ball bearing unit provided between the guide rail and the slider.

18. The display apparatus according to claim 17, wherein the ball bearing unit comprises:

a supporting pin disposed between the guide rail and the slider and positioned along a lengthwise direction of the guide rail; and

a rolling ball rollably installed on the supporting pin between the guide rail and the slider and contacted with the slider by a rolling motion.

19. The display apparatus according to claim 18, further comprising:
a supporting bracket provided between the main body and the guide bracket and having a supporting part to support the main body, and an extended part extended downward from the supporting part and coupled to the pair of sliders by passing through the guide bracket.

20. The display apparatus according to claim 5, further comprising:
a ball bearing unit provided between the guide rail and the slider.

21. The display apparatus according to claim 20, wherein the ball bearing unit comprises:
a supporting pin disposed between the guide rail and the slider and positioned along a lengthwise direction of the guide rail; and
a rolling ball rollably installed on the supporting pin between the guide rail and the slider and contacted with the slider by a rolling motion.

22. The display apparatus according to claim 21, further comprising:
a supporting bracket provided between the main body and the guide bracket and having a supporting part to support the main body, and an extended part extended downward from the supporting part and coupled to the pair of sliders by passing through the guide bracket.

23. The display apparatus according to claim 6, further comprising:
a ball unit provided between the guide rail and the slider.

24. The display apparatus according to claim 23, wherein the ball bearing unit comprises:
a supporting pin disposed between the guide rail and the slider and positioned along a lengthwise direction of the guide rail; and
a rolling ball rollably installed on the supporting pin between the guide rail and the slider and contacted with the slider by a rolling motion.

25. The display apparatus according to claim 24, further comprising:

a supporting bracket provided between the main body and the guide bracket and having a part to support the main body, and an extended part extended downward from the supporting part and coupled to the pair of sliders by passing through the guide bracket.

26. The display apparatus according to claim 7, further comprising:
a ball bearing unit provided between the guide rail and the slider.

27. The display apparatus according to claim 26, wherein the ball bearing unit comprises:
a supporting pin disposed between the guide rail and the slider and positioned along a lengthwise direction of the guide rail; and
a rolling ball rollably installed on the supporting pin between the guide rail and the slider contacted with the slider by a rolling motion.

28. The display apparatus according to claim 27, further comprising:
a supporting bracket provided between the main body and the guide bracket and having a supporting part to support the main body, and an extended part extended downward from the supporting part and coupled to the pair of sliders by passing through the guide bracket.

29. The display apparatus according to claim 28, wherein the guide bracket is displaced between the guide rail and the supporting bracket.

30. The display apparatus according to claim 3, further comprising:
a stand supporting part installed on the base part to provide an accommodating space for the pair of guide rails.

31. The display apparatus according to claim 27, wherein the slider smoothly moves along the guide rail as external wall faces of both sides of the slider are contacted by the rolling motion with the rolling ball within the guide rail.

32. The display apparatus according to claim 2, wherein the slider is drawn out from the guide rail to a predetermined length by an upward movement along the guide rail.

33. The display apparatus according to claim 3, wherein the spring supporting block coupled to the sliders perform a sliding motion along with a movement of the sliders.

34. The display apparatus according to claim 33, wherein the first and second spiral springs are coupled to the spring supporting block which moves together with the sliders and are extended and contracted according to the movement of the spring supporting block coupled to the sliders.

35. The display apparatus according to claim 5, wherein the first and second spiral springs are made of stainless steel with a thickness of 0.2mm to 0.35mm.

36. The display apparatus according to claim 7, wherein the first and second spiral springs include the coupling part to couple to the spring supporting block coupled to the sliders, and the wound part of the first and second spiral springs are unwound along circumferences of the first and second spring guides by a rotation of the first and second rotational shafts when the sliders and the spring supporting block move downward.

37. The display apparatus according to claim 36, wherein the wound part of the first and second spiral springs are wound along the circumferences of the first and second spring guides by the rotation of the first and second rotational shafts when the sliders and the spring supporting block move upward.

38. A display apparatus, comprising:
a main body;
a body bracket fixedly coupled to the main body;
a base part;
a stand part to stand on the base part;
a connecting assembly to connect the stand part to the body bracket;
a supporting bracket to support the connecting assembly;
a slider to connect to the main body;
a guide rail to stand on the base part, and to guide the slider to slide thereon so as to move the main body up and down; and
at least one spiral spring having an elasticity enough to support weight of the main body to extend and contract in response to a movement of the slider.